Nickel mixed hydroxide, process for the preparation thereof and use thereof as cathode material in alkaline batteries

Abstract

The invention describes a nickel mixed hydroxide with Ni as the main element and with a layer structure, comprising at least one element M_a from the group comprising Fe, Cr, Co, Ti, Zr and Cu which is present in two different oxidation states which differ by one electron in terms of the number of outer electrons; at least one element M_b from the group comprising B, Al, Ga, In and RE (rare earth metals) present in the trivalent oxidation state; optionally at least one element M_c from the group comprising Mg, Ca, Sr, Ba and Zn present in the divalent oxidation state; apart from the hydroxide, at least one additional anion from the group comprising halides, carbonate, sulfate, oxalate, acetate, borate and phosphate in a quantity sufficient to preserve the electroneutrality of the mixed hydroxide; and water of hydration in a quantity which stabilises the relevant structure of the mixed hydroxide.

The preparation of the nickel mixed hydroxide according to the invention is carried out by co-precipitation of the hydroxides in an alkaline medium. The nickel mixed hydroxides according to the invention are characterised by very high electrochemical utilisation of the nickel ions and high mass-related capacity values with very good cycle stability and are therefore advantageously suitable as cathode material in alkaline batteries.